

REMARKS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow. Applicants have amended the claims in order to overcome the rejections for indefiniteness.

Rejections Under 35 USC 103

Claims 1-3 and 13 are rejected as being obvious over Heiss (4,129,611). In example H-14, Heiss describes a polymer comprising 4,4'-diphenylmethane diisocyanate (MDI) and 1,4-cyclohexanediol of molecular weight 116 at an NCO/OH ratio of 1.05.

Applicants contend that this polymer would be not a shape memory polymer. A shape memory polymer needs at least one hard segment and at least one soft segment to exhibit shape memory properties. In general, for producing shape memory polyurethane, a combination of isocyanate and a chain extender is used as the hard segment, and polyol is used as the soft segment. The chain extender having a shorter chain length is stiffer and works as a harder segment, but the chain extender having a longer chain length drastically decreases the properties required for the hard segment. An exemplary combination of the hard segment is 4,4'-diphenylmethane diisocyanate (MDI) and 1,4-butanediol. It should be noted that since 1,4-butanediol has a similar chain length to 1,4-cyclohexanediol described in Heiss and has a higher stiffness than 1,4-cyclohexanediol in view of their molecular structures, 1,4-cyclohexanediol ought to work as the chain extender of the hard segment. Accordingly, the polymer described in Heiss has two hard segments, MDI and 1,4-cyclohexanediol, but has no soft segment. Thus, this polymer would not exhibit shape memory properties.

Because Heiss fails to teach or suggest shape memory polyurethane as mentioned above, applicants believe that it would not have been obvious to one of ordinary skill in the art to produce a shape memory polymer according to claim 1 on the basis of the polymer described in Heiss.

Conclusion

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested. The examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

Date August 31, 2006

By 

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